

## TOTARA AND HALL'S TOTARA

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The following notes are to help recognition of these two species in northern New Zealand. The differences in their morphology and ecological preference have been overlooked in some forest surveys, perhaps partly because Podocarpus hallii is thought to be a high-altitude species rarely found north of Auckland. In fact it is locally frequent here, especially above 300 m altitude where P. totara is likely to be absent, and it extends in distribution right up to the North Cape forest remnant at Te Paki trig.

Kirk (1889) named P. hallii after a Mr J.W. Hall of Thames, who grew young plants, presumably from the Coromandel Ranges, in his garden. These impressed Kirk as being quite different from young P. totara in their stiff branching and very large leaves arranged more or less in two rows. (On p. 228 of the above work, where Kirk has a table of differences between the two species, the character of the juvenile branching has accidentally been reversed).

The flexuous-branched totara juvenile is conceivably a rheophytic form, adapted to young alluvial sites where flooding is occasional. Hall's totara juveniles with their dense planar foliage are more shade tolerant and probably are more susceptible to drought (garden observations would be welcome here). So around Auckland one finds totara in the drier forest of floodplains and hillsides, with Hall's totara in sheltered valleys and in the Waitakere and Hunua Ranges.

As Hall's totara ages its foliage comes to resemble that of totara, though remaining slightly heavier. Kirk claimed that adult leaves are "invariably less than an inch in length" but de Laubelfels (1985) in his revision of the genus keys out P. hallii as having leaves mostly greater than 25 x 3.5 mm. In my opinion length is not a good discriminator but I can agree that 3.5 mm is about the best point for separation by breadth. From fertile material in AK, P. hallii leaves are (3-) 3.5-4.5 (-6) mm wide and P. totara 2.5-3.5(-4.5) mm.

There are two other useful characters in the adult foliage. Firstly, in Hall's totara the groove on the upper side of the leaf is deeper and wider than that of totara; this is true for both fresh and dried material (See Salmon p. 63, figs 4,7).

Secondly, foliage of P. totara has a yellow tinge to it especially on the leaf margins, midrib below and the new stem as it hardens. P. hallii leaves are green in contrast, and as the stem hardens it usually develops a purple coloration. The latter character was noted independently by A. Mitchell (1972) for P. hallii cultivated in Britain. This purpling of the first periderm cells is not perceptible in dried specimens but the yellowness of P. totara versus the relatively brown coloration of P. hallii is evident even in Kirk and Cheeseman collections.

Sections of adult leaves show a very similar anatomy (own obs.)

The "seed" of P. hallii, authors later than Kirk notwithstanding, is a good deal longer than that of P. totara (8 mm vs 5 mm) and is relatively pointed in its upper half.

Kirk thought that the pollen cones were larger in P. hallii and both he and Laubelfels suppose that these cones are borne singly in P. hallii but mostly clustered in P. totara. I am doubtful of these distinctions but have not seen enough specimens to give any quantitative information.

Besides the difference in juvenile foliage the best-known distinction between the species had been supposed to be the nature of the bark. Juveniles of both have papery bark (hence their Maori name "kotukutuku",

i.e. resembling Fuchsia excorticata). P. hallii at least in places like the Volcanic Plateau retains this character into adulthood, while P. totara develops a thicker more fibrous bark. Herbarium specimens hardly ever include a piece of bark, however my own observations in Rodney County and in the Waitakeres and Hunua Ranges are that P. hallii here has bark only slightly thinner and more papery than would be usual for P. totara. Hugh Wilson (1982) has noted a similar trait for P. hallii on Stewart Island.

Complicating the picture is the extensive hybridism between these and several other totara relatives (Webby et al. 1987). Quite a proportion of the trees in Auckland's parks and gardens have heavy foliage and rather fibrous bark, and I suspect that they might be hybrids between the two species rather than selections of P. hallii.

There is also the possibility that P. acutifolius or P. nivalis are involved in the parentage of unusual northern specimens. The above article lists a large tree with yellow-green foliage as P. nivalis x P. totara, from Kaikohe! P. hallii x P. nivalis on Moehau is noted too.

It may be consolation that the Maori hardly distinguished between P. hallii and P. totara; Jim Beever's dictionary (1987) has only a single (Wanganui) name for the former — not surprising, "totara kotukutuku". Kirk mentions that the Stewart Island Maori were the only ones he knew of that recognised two species, but he gives no name for P. hallii.

#### REFERENCES

- Beever, J. 1987 "A Dictionary of Maori Plant Names". Auckland Bot. Soc. Bull. 16.
- Kirk, T. 1889 "The Forest Flora of New Zealand". Wellington, N.Z.
- Laubelfels, D.J. de 1985 A taxonomic revision of the genus Podocarpus. Blumea 30:251-78.
- fitchell, A. 1972 "Conifers in the British Isles". H.M.S.O., London.
- Salmon, J.T. 1980 "The Native Trees of New Zealand". Reed, Wellington.
- Webby, R.F., Markham, K.R. and Molloy, B.P.J. 1987 The characterization of New Zealand Podocarpus hybrids using flavonoid markers. N.Z.J. Botany 25:355-66.
- Wilson, H.D. 1982 "Stewart Island Plants". Field Guide Publns, Christchurch.

#### FIELD TRIP - MT TE AROHA - 15 JULY 1989

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The group, ranging in age from six to eighty, with comprehensive checklist of plant species in hand (Rotorua Bot.Soc. April 1988) was led by John Smith-Dodsworth.

Progress up the track was slow, due to finding much of interest even in the lower reaches under the pine trees. This included hybridised forms of Blechnum chambersii and B. membranaceum. Speed increased with altitude and deteriorating weather.

Those reaching the top were not rewarded with a view, but with a fascinating range of forest greens as the forest progressed through pinkish tawari (Ixerba brexioides) lime/yellow tawa (Beilschmiedia tawa) to deep green beech (Nothofagus fusca mainly).

Two additional species were found which should be added to the checklist, these being Asplenium bulbiferum subsp. gracillimum and Displazium australe.